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Effects of Indigenous Farming Practices on Maize Production in Ondo State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A lot of indigenous knowledge had been lost through the deaths of elderly persons since there is no formal documentation of such knowledge. Old pests and diseases are beginning to resurface due to cropping patterns and adverse climate change impacts. It is in view of this that the study examine the effects of indigenous farming practices on maize production in Ondo State, Nigeria. A multistage sampling technique was used to select 120 maize farmers in the study area. Data was collected using validated questionnaire and were analyzed using means, frequencies, percentages, chi-square and Pearson product moment correlation. Findings from the study revealed that majority (80.8 percent) of the farmers were males, (86.7 percent) above 50 years of age, (87.5 percent) married, (87.5 percent) had formal education, (64.2 percent) were Christians, (25.8) followed by Muslim and (10 percent) traditionalist. A large percentage (75.8 percent) received information on indigenous control methods from their parents and grandparents. The result from the study revealed that there was a significant association between marital status ($\chi^2 = 10.06$, $p < 0.04$), religion ($\chi^2 = 8.05$, $p < 0.02$), membership of social group ($\chi^2 = 14.31$, $p < 0.00$) and the perceived

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effects of indigenous farming practices of the respondents. Similarly, findings revealed that there was a significant association between income (r = 0.45, $p \leq 0.05$), farm size (r = 0.13, $p \leq 0.05$), farming experience (r = 0.11, $p \leq 0.05$) of the respondents and the perceived effects of indigenous farming practices. There was no significant relationship between extension visitation ($\chi^2 = 0.04$, $p \leq 0.62$) and farmers use of indigenous knowledge. There was no significant relationship between indigenous farming practices (r = 0.04, $p \leq 0.65$) and farmers production practices.

Keywords: Indigenous; knowledge; farming; practices; maize; production.

1. INTRODUCTION

Nigeria is currently the tenth largest producer of maize in the world and the largest maize producer in Africa, producing an estimated 11,000 metric tonnes in 2019 (Mundi, 2020). It is estimated that seventy percent of farmers are small holders accounting for 90 percent of total farm output [1]. Maize crop started as a subsistence crop in Nigeria and has gradually risen to a commercial crop on which many agro based industries depend for raw materials [2]. General and more localized studies have identified several factors which have contributed to the dwindling maize levels in Nigeria and other Africa countries [3]. Paramount among these is the ravages caused by pests and diseases. Examples of these pests are maize beetles, maize weevils, corn leaf aphids, earwig, greasy cutworm, grain moth, rootworms, white grubs, army worms and diseases such as downy mildew, rust, leaf blight, stalk and ear rots, leaf spot, maize streak, corn smut, maize dwarf mosaic, stewart's wilt, gross wilt. Over many years indigenous people who are farmers have developed various ways to diagnose and treat plants, human and animal diseases and methods to fertilize soil. This knowledge which accrued over many years is critical and substantial part of the culture and technology of any society [4,5]. This sum of knowledge and experience of a given ethnic group forms the basis for decision making in the face of familiar problems and challenges. Indigenous knowledge has been institutionalized, improved upon and passed down from one generation to the next orally. Warren [6], defined Indigenous Knowledge (IK) as the local knowledge unique to a given culture or society. Prior to the introduction of modern chemical pesticides, maize farmers used a wide range of traditional pest control methods, some used only the dry woods ash while others mixed fine dry soil with wood ash, some mixed the ash with water or kerosene and used as spray. In all of these methods, treatments are applied within the leaf whorl of the plant [7,8]. Many also torn plastic bags and old plastic buckets tied to keep away birds. They use various botanical pest control methods developed by their ancestors. They are aware of a wide range of plant species with pesticides effects and animal species which controlled harmful insects. They are also aware of various materials and devices which could be used to trap, chase or destroy the pests or keep the pests away from their crops [9].

1.1 Problem Statement

A lot of indigenous knowledge has been lost through the deaths of elderly people since there is no formal documentation of such knowledge of IK they pose with others due to ignorance. IK use has been limited in market oriented production; hence producers could not enjoy economics of large scale production. Rural urban migration has also significantly reduced agricultural labor force. The increase in modern scientific, effective and efficient methods has limited reliance on IK use. Some IK were completely abandoned while some are still in use and more discoveries being made through trial and error. Population increase and pressure has also led to intensification of agriculture in some areas and this requires the use of modern techniques.

New pest and disease are emerging that did not exist in the past and old pests and diseases are reappearing, while people's attitudes toward agriculture have changed from being a livelihood provider to a lucrative business entity. All these have prompted people to make thrift and prudent decisions in regard to enterprise selection and input use. IK has the disadvantage of not having been captured and stored in a systematic way. The main reason for this constraint is that it is handled down orally from generation. The biggest limitation of sustained use of IK includes minimal sharing of intellectual property rights. In the past, farmers produced for themselves and family consumption only. However there is a drift to commercial Agriculture. Lack of knowledge, cooperation and sometimes attaching monetary value to the provision of IK has reduced it continued use. There is no standardized

measure for applying IK thus discouraging its use in today's modern farming. Indigenous knowledge bearers do not take aggressive steps to discover more indigenous knowledge tools. Despite these challenges, it is believed that some farmers still utilize IK on crop production. It is to this end that this study attempted to provide answer to the following research questions such as what are the socio-economic characteristics of the respondents in the study area? What are the sources of information on IK utilized by the respondents? What are the indigenous techniques being used for maize production and what are the effects of indigenous farming practices on farm output? This study was aimed to examine the effects of indigenous farming practices on maize production in Ondo state, Nigeria.

1.1.1 Hypotheses of the study

Ho1: There is no significant association between socio-economic characteristics of respondents and the perceived effects of indigenous farming practices.
Ho2: There is no significant relationship between extension visitation and use of IK techniques.
Ho3: There is no significant relationship between indigenous farming practices and production practices.

1.1.2 Significance of the study

Indigenous food production systems are fairly sophisticated and contribute significant to food security. These systems involve complex process for producing food from diversified agro ecological and socio-cultural environment to meet the subsistence needs of the people. The study will aid the documentation of IK practices in the study area (Table 1). The result from the study will serves as a source of information for extension agents to exchange knowledge among the farmers. It will also provide information for policy makers and planners which will aid policy information.

2. METHODOLOGY

This study was carried out in Ondo state, Nigeria. The state lies in the South-Western Nigeria. The people are mostly farmers. The farmers in the state grow cash crops (kolanut, cocoa, oil palm, rubber e.t.c) and food crops (including cassava, yam, vegetables and maize). A multi-stage sampling technique was used for this study. The first stage was the random selection of three (3) Local Government Areas out of the 18 local governments in Ondo state; these are Okitipupa, Idanre and Owo. The second stage was the random selection of 2 communities in each local government area making a total of 6 communities. Each community was divided into 4 wards out of which 2 wards was selected. From each ward 10 farmers were selected making a total of 20 farmers from each community and a total sample size of 120 farmers. Data for this study was obtained from both primary and secondary sources. Primary source was obtained from qualitative and quantitative sources. The quantitative source was obtained from validated interview schedule while the qualitative source was obtained from Focus Group Discussions (FGD) and Key Informants Interview (KII). Data was obtained from journals, reports, well structured, pretested, reliable and validated questionnaire.

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Respondents in the study Area

The study showed that 44.2 percent of the respondents were between the ages of 60 – 69 years, 22.5 percent were 70 years above while about 20 percent were between the ages of 50 – 59 years. The mean age of the farmers in the study area was 62 years, this indicate that larger percentage of the respondents are elderly persons. This was as a result of the older people who were purposively selected for the study. Thus a large proportion of the farming populations are adult, old enough to have a good indigenous knowledge base. The result from the Table reveals that majority (80.8 percent) of respondents were males, while 19.2 percent were females. This implies that farming in the study area was dominated by males compared to their female counterparty which also corroborates with the findings of Oladele and Adesope [10]. The result from the Table reveals that 87.5 percent of the respondents were married; about 5.0 percent of the respondents were single, while 3.3 percent of the respondents were widowed. The couple and the offspring complement one another's effort thereby reducing the stress that could have been in individuals working alone. The cost of labour is reduced too in the same manner, more information on indigenous knowledge are mostly likely to trickle in as each member of the family is a prospective source of receiving information on indigenous farming practices.

Table 1. Different IK practices of farmer and showing the output

		IK Practises	Output	
Farmers	• Extension activities • NGO's activities on Agriculture • Government policy on food crops • Sources of Information on Indigenous Knowledge	**Pest and disease control practices** • Dusted planting materials(sand) • Dusted planting materials(ash) **Soil fertility practices** • Application of animal manure • Incorporation of grasses into the soil • Burning of crop residue **Cultivation practices** • Drying maize seed under sun before planting • Manual weeding by hoeing • Land is prepared in form of mound and ridges **Processing and storage practices** • Fermentation • Drying • Stored on the floor • Stored on the shed	• Reduce weeds, pest and diseases • Improve soil fertility • Increases farm output • Improve product quality	Increase income

Findings from the study shows that 64.2 percent of the respondents had more than 20 years of farming experience, 20.8 percent of the respondents had between 16 - 20 years of farming experience, while only 12.5 percent had 11- 15 years of farming experience. The mean year of farming experience of the farmers was 20 years, which implies that the respondents had been in the farming business for quite a relatively long time. Farmers with higher years of experience tends to have full information, better knowledge, and are able to employ various indigenous practices for continued growth of the farms. Results reveals that 48.3 percent of the farmers had 0.1 - 2.5 hectares of land, 39.2 percent had 2.6 – 5.0 hectares, 8.3 percent had 5.1 – 7.5 hectares, while only 2.5 percent had 7.6 – 10.0 hectares. About 1.7 percent had above 10.1 hectares. The mean farm size of the farmers was 3.0 hectares. Majority of the respondents (95.8 percent) cultivated farm land of 7.5 hectares and below. It implies that majority of them were small scale farmers, most of the labour is provided by family members. Although hired labour is also used, the more family work in the farm, the higher production per hectare. It should also be noted that the respondents have more than one farm located in different areas in the locality.

Result from the study reveals that 44.2 percent of the respondents earned below ₦100,000, 34.2 percent earned between ₦100,001 - ₦300,000, 12.5 percent earned between ₦300,001- ₦500,000, 5.0 percent earned between ₦500,001- ₦700,000, while 4.2 percent earned above 700,001. The mean income of the respondents was ₦181,689.07. Thus it can be deduced that majority (78.3 percent) earn below the mean income. The results imply that an average farmers in the area earned ₦15,000 - ₦25,000 per month. This is about the same amount with the federal minimum wage of ₦18,000 which is being agitated that is too small to sustain an average Nigerian family and also below the poverty line of 1 dollar per person per day [11]. Farmers therefore need a raise in their income level if they must sustain the livelihood of their families.

3.2 Respondents' Sources of Information on Indigenous Knowledge Utilized for Food Crop Production

3.2.1 Sources of information to respondents

Fig. 1 shows that 42.5 percent of the respondents identified parents as the major source of information on indigenous knowledge utilized for food crop production, 33.3 percent

identified grandparents as sources of information on indigenous knowledge utilized for food crop production, 12.5 percent identified elderly people as sources of information on indigenous knowledge, 10.8 percent identified extension worker as sources of information to them, while 0.8 percent identified friends and relatives as sources of information on indigenous knowledge utilized for food crop production (Table 2). This implies that indigenous knowledge has been institutionalized, built upon and passed down from one generation to the next orally and that indigenous knowledge system is a systematic body of knowledge acquired by local people through the accumulation of experiences and informal experiments in an effort to cope with the agro-ecological and socio economic environment [12].

Table 2. Distribution of respondents according to their socio-economic characteristics

Characteristics	Frequency	Percentage (%)
Age (Mean = 62years)		
20-29	1	0.8
30-39	6	5.0
40-49	9	7.5
50-59	24	20.0
60-69	53	44.2
70 years and above	27	22.5
Sex		
Male	97	80.8
Female	23	19.2
Marital status		
Single	6	5.0
Married	105	87.5
Divorced	2	1.7
Widowed	4	3.3
Separated	3	2.5
Religion		
Christian	77	64.2
Muslim	31	25.8
Traditionalist	12	10.0
Occupation		
Farming	84	70
Rearing of Animals	4	3.3
Trading	15	12.5
Processor	3	2.5
Civil Servant	6	5
Hunting	8	6.7
Years of farming experience (Mean =20years)		
1-5 years	1	0.8
6-10 years	2	1.7
11-15 years	15	12.5
16-20 years	25	20.8
> 20years	77	64.2
Types of social organisation		
Non	25	20.8
Farmers group	41	34.2
Cooperative Society	30	25.0
Church Organisation	24	20.0
Farm size (ha) (Mean = 3.0ha)		
0.1 – 2.5 ha	58	48.3
2.6 – 5.0 ha	47	39.2
5.1 – 7.5 ha	10	8.3
7.6 – 10.0 ha	3	2.5
>10.1ha	2	1.7

Characteristics	Frequency	Percentage (%)
Educational level		
Non-Formal Education	21	17.5
Attempted Primary School	37	30.8
Completed Primary School	32	26.7
Attempted Secondary School	19	15.8
Completed Secondary School	7	5.8
Completed Tertiary School	4	3
Household size (Mean =7)		
1-5	49	40.8
6-10	53	44.2
11-15	12	10.0
16-20	6	5.0
Income (Mean = ₦181,689.07)		
<100,000	53	44.2
100,001-300,000	41	34.2
300,001-500,000	15	12.5
500,001-700,000	6	5.0
>700,001	5	4.2
Type of crops grown		
Maize	107	89.2
Cassava	101	84.2
Yam	115	95.8
Others	57	47.5

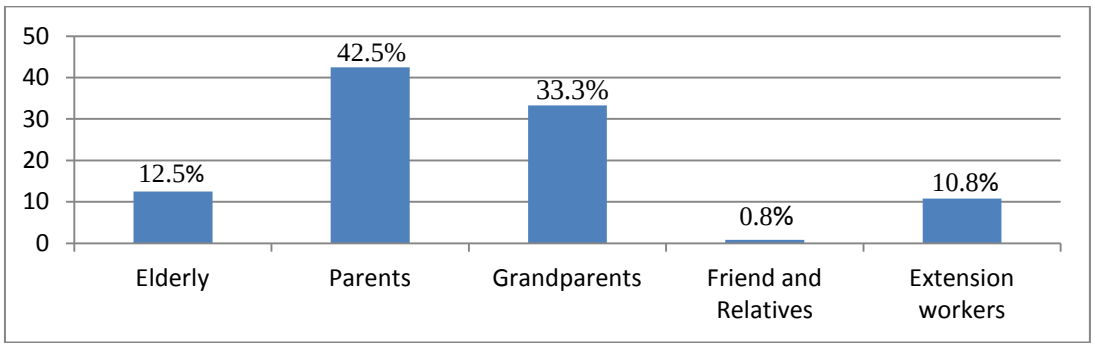

Fig. 1. Distribution of respondents according to sources of information

3.2.2 Indigenous methods of controlling maize pests

The result from Table 3 reveals that weeding (28.3 percent), clearing up all crop residues (22.5 percent) and dusted planting materials (ash) (20.0 percent) were the major indigenous methods used by respondents to control maize beetles in their farms. It was also found that burning of leaves (35 percent), clearing up all crop residues (16.7 percent) were the major indigenous methods used by respondents to control maize weevils on the farms. The Table shows further that destroying ant nest (45.8 percent), Sprinkling a light dusting of wood ash over plant and soil (26.7 percent) and use of basil leaves (efinrin) (16.7 percent) were the major indigenous methods used by the respondents to control corn leaf aphids in the farm. The Table reveals that sprinkling a light dusting of wood ash (42.5 percent), destroying ant nest (24.2 percent) and the use of basil leaves (efinrin) (17.5percent) were the major indigenous methods used by respondent to control corn silk fly in their farms.

The study indicate that clipping off the tip of the ear and other affected area (55.8 percent) and use of marigold leaves (ejinrin) (34.2 percent) were the major indigenous methods used by respondents to control ear wig in their farms. Further findings showed that 10.0 percent used black soap rubbed with local chicken egg placed inside the soil to control the pest. The findings from the study points that clearing up all crop residues (34.2 percent), dusted planting

materials (sand) (18.3 percent), dusted planting materials (ash) (17.5 percent) and burning of leaves (16.7 percent) were the major indigenous methods used by respondents to control greasy cutworms in their farms. The result from the Table reveals that destroying ant nest (45.0 percent), use of basil leaves (efinrin) (28.3 percent) and sprinkling a light dusting of wood ash over plants and soil (16.7 percent) were the major indigenous methods used by respondents to control grain moths in their farms.

Result of the study supports the findings of Orunoye and Okrikata [13] that maize beetles is best controlled through weeding, clearing up all crop residues and dusted planting material (ash), while maize weevils is best controlled by burning of leaves, clearing up all crop residues and dusted planting materials (ash). A Corn leaf aphid is best controlled by destruction of ant nest, sprinkling a light dusting of wood ash over plant and soil and use of basil leaves. Ear wig is best controlled by clipping off the tip of the ear and affected area, and use of marigold leaves (ejinrin), greasy cutworms is best controlled by clearing up all crop residues, dusted planting material (sand), dusted planting material (ash) and burning of leaves. Control of grain moths is best controlled by destruction of ant nest, use of basil leaves (efinrin) and sprinkling a light dusting of wood ash over plants and soil.

Table 3. Respondents' indigenous methods of controlling maize pest

Pest	Frequency	Percentage (%)
Maize beetles		
Weeding.	34	28.3
Burning of leaves.	10	8.3
Clear up all crop residues.	27	22.5
Sprinkle red pepper.	8	6.7
Dusted planting materials (sand).	4	3.3
Hand picking of beetles.	13	10.8
Dusted planting materials (ash).	24	20.8
Maize weevils		
Weeding.	6	5.0
Burning of leaves.	42	35.0
Clear up all crop residues.	20	16.7
Sprinkle red pepper.	14	11.7
Dusted planting materials (sand).	18	15.0
Dusted planting materials (ash).	20	16.7
Corn leaf aphids		
Use of basil leaves.	20	16.7
Use of marigold leaves.	13	10.8
Destroy ant nest.	55	45.8
Sprinkle a light dusting of wood ash over plant and soil	32	26.7
Ear wig		
Use of black soap rubbed with local chicken egg placed inside the soil.	12	10.0
Use of marigold leaves (ejinrin).	41	34.2
Clip off the tip of the affected area.	67	55.8
Greasy cutworms		
Weeding.	1	0.8
Burning of leaves.	20	16.7
Clear up all crop residues.	41	34.2
Sprinkle red pepper.	18	15.0
Dusted planting materials (sand).	22	18.3
Dusted planting materials (ash).	21	17.5
Grain moth.		
Use of basil leaves (efinrin).	34	28.3
Use of marigold leaves (ejinrin).	12	10.0
Destroy ant nest.	54	45.0
Sprinkle a light dusting of wood ash over plants and soil.	20	16.7

3.2.3 Indigenous methods of controlling maize diseases

Table 4 reveals that destruction of weed (73.3 percent) was the major indigenous methods used by the farmers to control downy mildew on their farm. The Table indicates that majority (56.7 percent) of the respondents used local resistant variety to control rust on their farms. The study also found that majority (61.6 percent) and (22.5 percent) of the respondents used good field sanitation and crop rotation to control leaf blight on their farm. The study found that majority (75.0 percent) of the respondents used destruction by burning the affected plant to control stalk and ear rots in their farms.

The findings shows that majority (66.6 percent) and (19.2 percent) of the respondents used crop rotation and good field sanitation to control leaf spot on their farm. The Table shows that majority (60.0 percent) of the respondents used destruction of weed to control maize streak in their farms. Result of the study supports the findings of Fajemisin and Oladipo [14] that downy mildew is best controlled through destruction of weed and use of local resistant variety , while rust is best controlled by using local resistant variety and destruction of weed. Leaf blight is best controlled through good field sanitation and rotating crops. Stalk and ear rots is controlled by burning the affected plant. Leaf spot is controlled by rotating crops and good field sanitation. Maize streak is controlled using destruction of weed and use of local resistant variety.

3.3 Extension Agents' Visit to Respondents

The result in Fig. 2 indicates that majority (63.3 percent) of the respondent were not visited by extension agents, 29.2 percent were visited annually, 5.8 were visited twice in a year and 1.7 percent were visited thrice in a year, this implies that extension activities in the study area is poor, During the Focus Group Discussion with the farmers' majority of the farmers asserted that they receive information about indigenous knowledge from their parents and grandparents as shown in Fig. 2. This confirm Okunlola and Adekunle [15] assertion that indigenous knowledge is transferred orally from generation to another in south western Nigeria and that the extension system is inefficient to introduce modern farming techniques to the farmers.

Table 4. Respondents' indigenous methods of controlling maize disease

Diseases	Frequency	Percentage (%)
Downy mildew	88	73.3
Destruction of weed.	32	26.7
Use of local resistant variety.		
Rust		
Destruction of weed.	52	43.3
Use of local resistant variety.	68	56.7
Leaf Blight		
Good field sanitation.	74	61.6
Rotate crops and remove crop debris.	27	22.5
Plant resistance varieties.	19	15.8
Stalk and Ear Rots		
Destroy by burning the affected plant.	90	75.0
Sprinkle red pepper.	14	11.7
Plant resistant varieties.	16	13.3
Leaf Spot		
Good field sanitation.	23	19.2
Rotate crops and remove crop debris.	80	66.6
Plant resistance varieties.	17	14.2
Maize Streak		
Destruction of weed.	72	60.0
Use of local resistant variety.	48	40.0

3.4 Respondents' Perceived Effects of Indigenous Farming Practices on Their Farm Output

Result in Table 5 showed that the farmers strongly agreed that indigenous farming practices promote early germination ($\bar{X}$ = 4.48), improved soil fertility ($\bar{X}$ = 4.43), improved storage of crops ($\bar{X}$ = 4.43), promote healthy crops ($\bar{X}$ = 4.43), are compatible to farming system ($\bar{X}$ = 4.39), provide sustainable solution to the problem of soil fertility ($\bar{X}$ = 4.36), reduced pests and diseases ($\bar{X}$ = 4.33), are efficient ($\bar{X}$ = 4.33) , increased their crop yield ($\bar{X}$ = 4.32), improved the quality of their product ($\bar{X}$ = 4.32). This implies that indigenous knowledge technologies [16] and know-how have an advantage over introduced or scientific technologies this is because they rely on locally available skills and materials and are often more cost effective than introducing exotic technologies from outside sources as well as local people are familiar with them and so do not need any specialized training [17].

Result in Table 5 also showed that farmers disagreed that indigenous farming practices are not effective ($\bar{X}$ = 4.33), has not increase their farm income ($\bar{X}$ = 4.30), has not enhance processing of crops ($\bar{X}$ = 4.27), has not improve farm yield ($\bar{X}$ = 4.25), are not cheap ($\bar{X}$ = 4.25), has not increase their farm output ($\bar{X}$ = 4.24), have no side effects ($\bar{X}$ = 1.93). The result implies that farmers are of the opinion that indigenous farming practices are still highly effective. This is because the measure is very cheap, simple enough to be applicable under particular circumstances, cost effective and sustainable.

3.5 Hypotheses Testing

3.5.1 Hypothesis 1

(Ho1): There is no significant association between socio-economic characteristics of respondents and perceived effects of indigenous farming practices.

The results of Chi-square analysis as presented in Table 6a showed that there was a significant relationship between perceived effects of indigenous farming practices and marital status (χ^2 = 10.06, p < 0.04), religion (χ^2 = 8.05, p < 0.02), membership of social group (χ^2 = 14.31, p < 0.00) of the respondents. But there was no significant relationship between sex (χ^2 = 0.01, p < 0.91) and educational status (χ^2 = 9.15, p < 0.10). This implies that indigenous farming practices had effects on their farms irrespective of whether they are male of female or whether they are educated or not educated.

The Pearson Product Moment Correlation (PPMC) in Table 6b also shows that the income (r = 0.45, $p \leq 0.05$), farm size (r = 0.13, $p \leq 0.05$), farming experience (r = 0.11, $p \leq 0.05$) had a positive and significant relationship with perceived effects of indigenous farming practices. This implies that as income increases, the effects of indigenous farming practices also increase, the larger the farm size, the more the effects of indigenous farming practices.

There is a positive and non-significant relationship between age (r = 0.07, $p \leq 0.05$) and perceived effects of indigenous farming practices which means that correlation of age with perceived effects of indigenous farming practices is not significant.

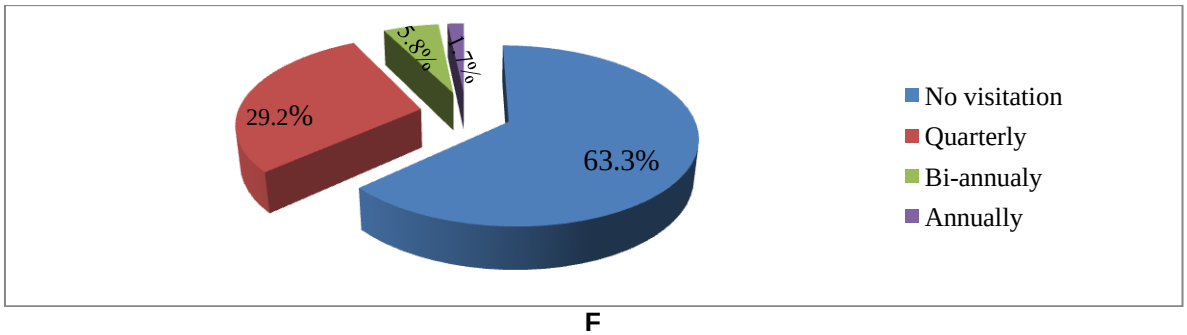

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Fig. 2. Distribution of respondent according to extension agents' visit

Table 5. Distribution of respondents' according to perception of the effects of indigenous farming practices on their farm output

S/N	Statement	SA	A	U	D	SD	Mean
1	Indigenous farming practices promote early germination.	64(53.3)	52(43.3)	2(1.7)	1(0.8)	1(0.8)	4.48
2	Indigenous farming practices improved soil fertility.	69(57.5)	42(35)	3(2.5)	4(3.3)	2(1.7)	4.43
3	Indigenous farming practices improved storage of crops.	65(54.2)	48(40)	2(1.7)	3(2.5)	2(1.7)	4.43
4	Indigenous farming practices promote healthy crops.	61(50.8)	54(45)	2(1.7)	2(1.7)	1(0.8)	4.43
5	Indigenous farming practices are compatible to farming system.	61(50.8)	51(42.5)	4(3.3)	2(1.7)	2(1.7)	4.39
6	Sustainable solution to the problem of soil fertility.	58(48.3)	51(42.5)	8(6.7)	2(1.7)	1(0.8)	4.36
7	Indigenous farming practices are not effective.	8(6.7)	4(3.3)	4(3.3)	28(23.3)	76(63.3)	4.33
8	Indigenous farming practices reduce pests and diseases.	57(47.5)	54(45)	2(1.7)	5(4.2)	2(1.7)	4.33
9	Indigenous farming practices are efficient.	58(48.3)	53(44.2)	4(3.3)	1(0.8)	4(3.3)	4.33
10	Indigenous farming practices increased my crop yield.	48(40)	65(54.2)	5(4.2)	1(0.8)	1(0.8)	4.32
11	Indigenous farming practices improved the quality of my product.	48(40)	65(54.2)	5(4.2)	1(0.8)	1(0.8)	4.32
12	Indigenous farming practices have not increase my farm income.	2(1.7)	2(1.7)	1(0.8)	68(56.7)	47(39.2)	4.30
13	Indigenous farming practices have not enhance processing of crops.	2(1.7)	3(2.5)	2(1.7)	67(55.8)	46(38.3)	4.27
14	Indigenous farming practices have not improve farm yield.	1(0.8)	2(1.7)	2(1.7)	76(63.3)	39(32.5)	4.25
15	Indigenous farming practices are not cheap.	1(0.8)	2(1.7)	2(1.7)	76(63.3)	39(32.5)	4.25
16	Indigenous farming practices have not increase my farm output.	2(1.7)	4(3.3)	4(3.3)	43(35.8)	63(52.5)	4.24
17	Indigenous farming practices have no side effect.	47(39.2)	57(47.5)	2(1.7)	5(4.2)	9(7.5)	1.93
	Grand Mean.4.20						

Table 6a. Relationship between respondents' personal characteristics and the perceived effects of indigenous farming practices

Socio-economic versus perceived effects of indigenous farming practices	Chi-square calculated value χ^2	Df	*p*-value	Decision
Sex	0.01	1	0.91	Not significant
Educational status	9.15	5	0.10	Not significant
Marital status	10.06	4	0.04	Significant
Religion	8.05	2	0.02	Significant
Membership of social group	14.31	3	0.00	Significant

Significant at 0.05, df = degree of freedom

Table 6b. Relationship between socio-economic characteristics and the perceived effects of indigenous farming practices

Socio-economic versus perceived effects of indigenous farming practices	r-value	*p*-value	Decision
Age	0.07	0.46	Not significant
Income	0.45	0.00	Significant
Farm size	0.13	0.00	Significant
Farming experience	0.11	0.00	Significant

Significant at 0.05

Table 7. Relationship between extension visitation and respondents' use of indigenous methods

	r-value	p-value	Decision
Extension agents' visitation and use of indigenous methods	0.04	0.62	Not significant

Significant at 0.05

Table 8. Relationship between indigenous farming practices and production practices

	r-value	*p*-value	Decision
Indigenous farming practices and production practices	0.04	0.65	Not significant

Significant at 0.05

3.5.2 Hypothesis 2

There is no significant relationship between extension visitation and the use of indigenous knowledge techniques.

The result of Pearson Product Moment Correlation (PPMC) in Table 7 reveals a non-significant relationship between extension visits ($r = 0.04$, $p \leq 0.62$) and farmers' use of indigenous methods. This implies that farmers will continue to use indigenous methods regardless of whether they are being visited by extension agents or not. This is because extension services are not available to disseminate information on innovation for crop production to the farmers. The result confirms the findings of Okunlola [18] that most farmers got their information on indigenous methods from their parents and grandparents and not from agricultural extension agents.

3.5.3 Hypothesis 3

(Ho3): There is no significant relationship between indigenous farming practices and production practices.

The result of Pearson Product Moment Correlation (PPMC) in Table 8 reveals a non-significant relationship between indigenous farming practices ($r = 0.04$, $p \leq 0.65$) and production practices. This implies that farmers will continue with their production practices regardless of whether they practice indigenous farming or not. This is because indigenous farming practices are not effective in large scale production, as a result of these farmers tends to produce their own food, made their own implement and conduct their own farming activities [15].

4. CONCLUSION AND RECOMMENDATIONS

The study has shown that majority of the farmers in the study area utilized indigenous methods on maize production as they regard it as simple to use, affordable, cost effective, sustainable and compatible with their culture. Farmers use indigenous methods in combination with scientific methods in maize production. Extension activities in the area are at the lowest ebb without being impacting much to the farmers' indigenous knowledge or new technology. On the basis of the findings of the study, the following measures are recommended: Indigenous method should be domesticated in order to avoid their extinction, Extension agents need to be well equipped with well packaged indigenous methods, This will help them to be more knowledgeable and possibly help in formal documentation and records keeping of such methods, There is need for well funded and effective extension system to help

the farmers, There is the need for extensive empirical documentation of indigenous practices by Non-Governmental Organization, scientist, expert and relevant organization to enhance the use of indigenous methods for future farmers, There should be a symbiotic relationship between agricultural extension agents and local custodians of indigenous methods to learn from one another. This will help in documenting, preserving and possibly transferring knowledge to other communities. Research should be made on improving the use of indigenous methods for agriculture by integrating this knowledge with modern scientific technology.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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